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Combat Crew

strategic air command

JUNE 1981

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"WHY SAC EXERCISES?"

Maj Gen Lewis C. Buckman
Deputy Chief of Staff, Operations

"We have done so much with so little for so long that now we can do everything with nothing forever." I am sure you have either seen or used this phrase during your Air Force career. Today, the underlying thought behind this phrase is manning. Along with all our services, the Air Force is experiencing a shortfall in the required number of personnel, especially in the critical fields. Numerous steps are being taken to help solve this shortfall, but this does not change the current fact of life for those of us turning wrenches, keys, or airplanes. The fact of the matter is — our mission remains, and we still must insure we can accomplish our mission successfully, regardless of our manning shortfalls.

In SAC we hear a lot concerning "the mission;" it might be valuable to discuss what the "mission" entails. AFM 1-1 states that "the fundamental objectives of United States military forces are to sustain deterrence, assure territorial integrity, conduct warfare, and resolve conflict in a manner favorable to the United States." The first of these objectives deserves closer examination, for only if deterrence fails will we most likely have to address the other three objectives. AFM 1-1 also states that "deterrence results from a state of mind . . . the perception by other nations of our capability, intent, and will." The key word for SAC is *capability*. We must insure that our capability is there; this capability involves combining existing weapons systems with a force of well-trained people to maintain and operate these systems. To carry this idea a step further, we must also clearly transmit this capability to any potential aggressor. By doing so we help develop their perceptions to insure that deterrence remains a viable fundamental national objective.

This brings us to the thrust of this article: SAC exercises. Through our numerous exercises (and inspections), we help ensure that our capability does exist to meet these national objectives. In each of these exercises, we learn, we refine, and we thus enhance that capability. We all understand that

SAC's primary role remains one of nuclear deterrence, and SAC has a long history of exercises which have helped improve that nuclear deterrent capability. Yet our role is not limited solely to the nuclear environment. AFM 1-1 points out that through mutually supporting conventional, theater nuclear, and strategic triad forces, the United States is able to meet ". . . possible military threats throughout *the spectrum of warfare*. As a result, deterrence and warfighting capability are provided for all levels of potential conflict."

This spectrum leads to SAC's conventional operations and our collateral missions of sea reconnaissance/surveillance and aerial minelaying. Conventional bombing is not new. SAC's performance during the Vietnam conflict continued a long, distinguished history of long range strategic bombardment. Since then, the units flying the B-52D have had extensive experience in conventional exercises. More recently, other flying units have become involved with collateral missions as they have trained in sea surveillance/reconnaissance, and with the advent of the Strategic Projection Force, our B-52H units have developed the capability to rapidly mobilize, deploy, and fly missions in support of national tasking.

As a result of this emphasis on SAC's ability to support across the spectrum of conflict, we find ourselves developing more exercises and participating in more joint exercises. These efforts have become more complex and demanding for all — from the planners down to the "doers". This is done for several reasons. From each exercise we sit back and look at what we did, how we did it, and what the results were; from this evaluation we learn how we can meet future actual taskings better. Another reason for the increased complexity and difficulty is that you have demonstrated your ability to operate under adverse conditions. Each time an exercise is made more difficult, the more we see new problems and challenges develop, and the more we learn in this process. The end result of all this activity is a force fully trained, willing, and prepared to professionally accomplish the tasks placed upon us by our national leaders.

Your performance has been impressive; the results you have achieved have enhanced SAC's reputation as a professional branch of the United States Air Force. More importantly, you have clearly demonstrated a capability to any potential aggressor which must make him pause and reflect on any unfriendly act towards the U.S. or our friends.

In closing, let me give you a glimpse of what's ahead: more hard work with exercises which are more complex and involved than those you have seen thus far. I am sure you will respond to these exercises in the same way you have in past ones. SAC's capability to meet our mission depends on your efforts. ★ ★

Combat Crew

Magazine of the Strategic Air Command - 31st Year of Publication

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FLARE

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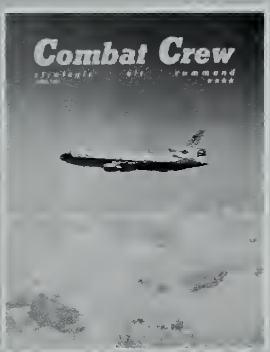

ON OUR COVER

SAC's newest aircraft — the KC-10. For more on the story, see page 4.

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Magazine of the Strategic Air Command - 31st Year of Publication

FROM QUESTION MARK to EXCLAMATION POINT

Maj Chas E. Bailey
Det 2, 4200 T&E Sq

During a one week period in January of 1929, a significant place in aerial refueling history was made by three small airplanes and a handful of enduring aviators. One of the airplanes, a Fokker C-2, nicknamed the Question Mark, was kept aloft for a record six and one-quarter days by two Douglas C-1 aerial refuelers. The C1's had the capability to transfer 150 gallons of fuel to the Question Mark through a hose lowered inflight to waiting hands below. Working together through daylight, darkness, and adverse weather, the little group of men and machines managed to transfer 5050 gallons of gasoline.

Those inflight refuelings took place more than 42 years ago and the question may come to mind: Where has air refueling gone from there?

The answer to that question takes the form of a brand new, 590,000 pound baby for the Strategic Air Command — the KC-10A Extender — delivered to Barksdale AFB on 17 March 1981. The Extender is built to do basically the same job as those early C-1's. Only the Extender can do the job much much better.

The KC-10A military version of the commercial DC-10-30 wide bodied freighter aircraft provides the Air Force with greatly increased flexibility in its mix of aircraft used for the deployment of cargo and airborne weapon systems. A receiver aircraft itself, the KC-10A in its tanker role is designed to refuel a wide mix of planes, including fighters, strategic airlifters, and equipment flown by other branches of the military and allied nations. Typical examples of Extender performance include: the ability to deliver 200,000 pounds of fuel to a receiver 2200 miles from a KC-10A home base, then itself return to home base unrefueled; the ability to carry a maximum cargo payload of 170,000 pounds a distance of 4370 statute miles; and finally, the capability to fly an unrefueled ferry range of 11,500 statute miles.

Currently, there are two KC-10A airframes in use and both are undergoing extensive engineering and operational testing. Ship 1 is being evaluated at the Douglas Aircraft Flight Test Facility in Yuma, Arizona; primary emphasis during its testing is on the confirmation of design specifications. Ship 2, the first production configured aircraft is being used for a six month follow-on operational test and evaluation program. Based at Barksdale AFB, Ship 2 is being flown by crews from Det 2, 4200 T&E Squadron under the operational control of the AFT&E Center; primary emphasis during Ship 2's evaluation will be on its capability to perform the aerial refueling/cargo mission.

The KC-10A, as it enters the SAC inventory, brings with it several unique "user" aspects, including its crew complement, maintenance/logistics support concepts, and civilian contractor crew training program. All of these items reflect a strong influence deriving from the world wide use of commercial versions of the DC-10 series aircraft.

First off, the crew of the KC-10A, which includes a pilot, copilot, flight engineer, and boom operator, most noticeably does not include provisions for a navigator. Navigation responsibilities fall to the pilots, which parallels commercial usage of the aircraft. The fact that the pilots have the time and equipment to handle traditional navigator duties, such as enroute navigation, aerial refueling rendezvous, and weather avoidance, points to the level of equipment sophistication typical of the new tanker.

Pilots have three inertial navigation systems available for mission programming, along with several sets of dual navigation and communications radios. These, combined with multicolor, computerized weather/mapping radar scopes, allow the pilots to very accurately position themselves anywhere in the world. During the progress of any mission, the pilots also have a dual autopilot, dual flight director flight guidance system that can be programmed to automatically track along radio aid or inertial navigation courses; coincidentally, pilots can program the FGS for climbs, descents, and automatic leveloffs, while employing an autothrottle system that provides hands off control of power through all phases of flight. Combined, these features allow the pilots to *"automatically"* fly heads up, enhancing the time available to scan through several oversize cockpit windows for conflicting air traffic, rendezvous aircraft, terrain obstacles, and of course, runways.

Significantly, KC-10A pilots do not have the sometimes traditional array of aircraft systems to operate and monitor. This reduction in their workload is the direct result of the crewmember sitting immediately behind them: the flight engineer. The KC-10A flight engineer supplements the pilots' eyes, ears and hands by controlling the aircraft's "life" systems, via hydraulic, electrical, pneumatic, fuel, fire detection, and auxiliary power unit panels, to name but a few. The FE has direct control of the fuel system during all onload and offload operations and is responsible for the aircraft's weight and balance during fuel transfers, and throughout the mission. During all power critical phases of flight, such as takeoff, climb, air refueling, missed approach, and landing, the FE actually positions his seat behind the throttle quadrant, and assists with power management. With direct access to the control head of the number three INS unit, the flight engineer is also involved in aircraft navigation and the use of performance information available through the INS.

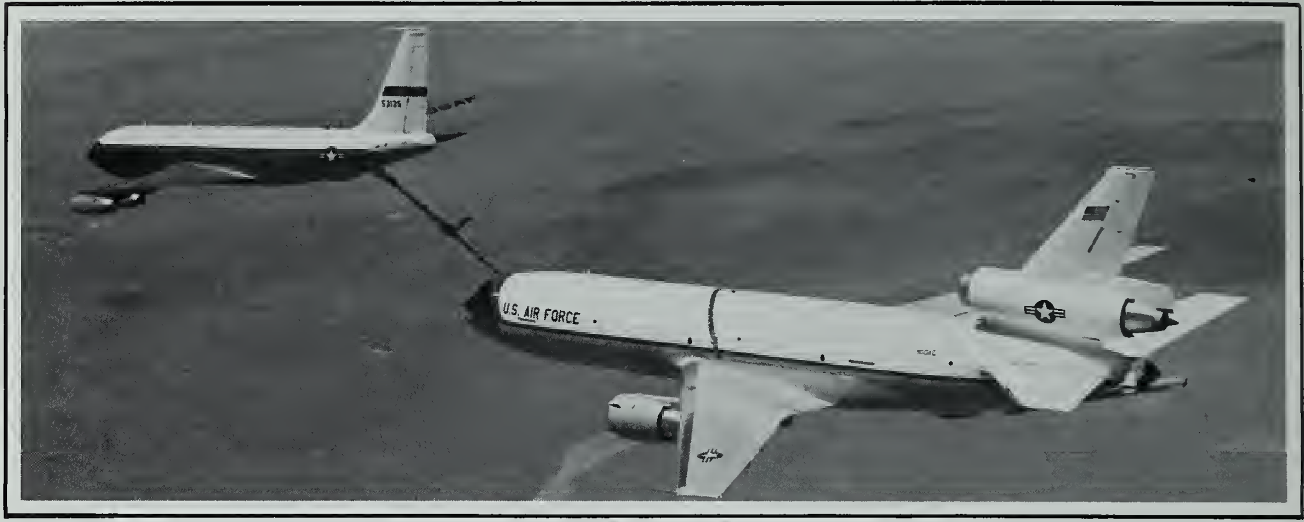
The fourth person on the crew, the boom operator, is at the heart of KC-10A mission accomplishment. The boom operator is the key person insuring the safe and sure transfer of fuel to the Extender's wide variety of receivers. He also provides the KC-10A with loadmaster muscle and expertise, when he manages cargo loads of up to 170,000 pounds. Although the boom operator has a forward station in the cockpit, his business office is really far to the back of the Extender's 180 foot fuselage, at the aerial refueling operator's station. And the boom operator's new office is efficient. No longer confined to a prone position during aerial refueling, the station now has three seats: one for the boom operator, one for an instructor and one for an observer to work from. The seats, facing aft toward a picture window view of receiver aircraft, reduce fatigue and enhance efficiency. With digital controls and displays for easy reference, he has control of a new aerial refueling boom through a digital, "fly by the wire" system. As the boom operator maneuvers the boom, his control stick

inputs translate through a computer to the boom, allowing precise control of its 58 foot length. Unique aspects of the boom include a large spatial maneuvering envelope, automatic load alleviation to eliminate boom bending and nozzle binding, and the boom operator's ability to adjust control forces in the pitch and roll stick to his preference. Should the boom operator be faced with a probe equipped receiver, he also has the ability to deploy a drogue basket with a long hose reel assembly. One final nicety in the new office: he has control of his environmental system. No more cold feet.

During his cargo loading duties, the boom operator is responsible for loading and securing up to 27 pallets of cargo. To assist him, the cargo hold has integral floor rollers, including a number of motorized rollers near the 102 by 140 inch cargo door; using a hand-held control unit, he can maneuver loaded, palletized cargo onto the free running rollers, and then manually position and secure his pallets throughout the cargo hold. To enhance the boom operator's wide bodied aircraft cargo loading expertise, SAC manned the KC-10 test team with a unique position: the command's only loadmaster.

While the Extender's crew specialties provide several unique additions to SAC's aerial refueling mission, the aircraft's maintenance and logistics concepts add even more. On the one hand, KC-10A flight line maintenance and maintenance management functions are performed by USAF personnel; but on the other hand the aircraft contractor manages support equipment, spare parts, intermediate and depot level maintenance, systems management and technical support. Similar to the C-9A "Nightingale" support agreement, the KC-10A package insures maintenance and logistics availability for the Extender on a worldwide scale, based on existing contractor facilities that are supporting commercial DC-10 users.

Crewmember training presents yet another area reflecting the commercial lineage of the KC-10A. Under a contract agreement, flight personnel will receive their initial academic ground school through the American Airlines training system, tailored to the KC-10, at a Barksdale AFB facility. During an interim training period, crewmembers (pilots and flight engineers) will also receive simulator time at the contractor's training academy, until the first KC-10A motion/visual simulator is delivered to Barksdale. Following simulator flights, pilots and FE's will practice in a cockpit procedures trainer at the Barksdale training facility, just prior to the start of their flying missions with Air Force instructors. Boom operators will receive refueling simulator training concurrent with the other crew positions' simulator and CPT time, prior to flight. The first follow-on crews will enter their initial qualification program during this summer.



One final feature brought to SAC's aerial refueling forces by the KC-10A is an Air Force Reserve associate aircrew program, which will eventually provide a mixed crew force of reservists and active duty Air Force crews. The first follow-on Reserve crew will begin training in late summer of this year, and will be attached to the 78th ARS (H) Associate, as it is activated.

Although the number of KC-10As flying is small, production is geared to increase the fleet to six aircraft by early fall 1981 and well beyond that number by the end of 1982.

All in all, the KC-10A is a bright and shining new addition to SAC's aerial refueling forces. It cannot replace or supersede that basic vital airborne link of aerial refueling provided so well through the past four decades by many many other tankers. Rather, it joins the fleet and the mission as our newest and biggest inflight Extender.

CFIC Corner

ARE YOU PROFICIENT

TSgt Charles H. Heath
Central Flight Instructor Course
Castle AFB, CA

When Noah was commanded to build an ark, three stories high with a window and a door on the side, the length, breadth, and height were clearly defined. Noah did not receive any blue prints as to how and where he was to place the beasts, or even where to store the food they were to eat. What about his passengers? Where were they to sit? As the rains came, and the water rose, the ark was tossed about, but at the journey's end, all the cargo arrived safely. Noah didn't need the information provided to us by the traffic management office. He acted on faith, but let's face it, who was going to be waiting at the loading dock to complain?

In a sense a boom operator is a modern day Noah for he/she is involved in the loading and unloading of cargo and passengers on the KC-135. However, unlike Noah, the boom operators do need and have at their disposal the guidance from the Traffic Management Office (TMO), the type, size, weight, and dimensions of the cargo to be loaded as well as its destination. Even though boom operators have TMO's assistance, they still have the responsibility of planning, loading, securing and unloading designated loads. This responsibility also includes completing the reams of necessary paperwork that will help him/her in configuring cargo and passengers on the aircraft.

When Boom Operators perform the duty of a loadmaster, they must remember what aids are at their disposal and then use them. T.O. IC-135(K)A-9, Cargo Loading Instructions and SACM 51-135, VOL VI, Aircrew and Aircraft Operations, Limitations/Restrictions are just a couple of aids that the boom operator should be thoroughly familiar with.

To enhance the boom operator's proficiency in cargo/passenger loading and unloading procedures, SAC established the Cargo/Passenger Loading Training program (H-71), which is an annual requirement.

The Cargo/Passenger Loading Trainer (CLT) is used as a substitute for "hands-on" training. The cargo/passenger training program provides the boom operator with instructions that will help him/her to maintain proficiency in cargo/passenger loading, securing and unloading procedures. But, we as boom operators must realize that a training program is only as good as the managers and the users make it.

continued page 27

ELEVEN O'C
FOUR

During cell takeoff and formation flight, crew teamwork plays an important part in successfully and safely accomplishing the mission. But on this day teamwork, which had worked effectively so many times before, would break down to the point of near disaster.

The day started like many others during the winter months: fog and drizzle with the accompanying low cloud ceilings and poor visibility that would bring instrument flight conditions almost immediately after takeoff.

The mission had been thoroughly planned during mission planning day. We were number-two in a two-ship tanker cell. After cell takeoff and join-up our cell would rendezvous with the receiver in a nearby refueling anchor, conduct the aerial refueling, and subsequently split up for separate navigation and transition training. During the pre-takeoff cell briefing we again discussed the only quirk in today's otherwise-routine mission — the fact that, due to special-use airspace adjacent to our anchor area, we would be orbiting and refueling using right turns rather than the customary left turns. For a cell using right echelon formation this meant that the cell leader would notify us (shortly) before initiating his turn, and we would then drop back to near-trail position for the turn. Both crews had used this technique before, and having been reminded we continued with our preflight activities. The weather briefing confirmed our suspicions that we would be 'in the soup' through at least level-off. As the crew navigator, my most important duty would prove to be that of station-keeping.

LOCK and MILES

Our pilot's cell technique for climb-out was to keep the cell leader in our eleven o'clock position. With the cell leader at the eleven o'clock position we would avoid his jet wash yet be in a near-enough-trail position for turns.

I had the cell leader on radar from his take-off roll. Our use of the Standard Instrument Departure proved to be routine with no ATC vectors or intermediate level-offs. With the previously discussed differential climb-out airspeeds we quickly closed the gap between aircraft to about four miles. 'Eleven o'clock and four miles' was my, what seemed too repetitious, interphone call for the remainder of the SID.

Our pilots are in a habit of including the radar scope in their cross checks during cell work, but today heavy icing and light-to-moderate turbulence kept them out of the scope. We were an integral crew of experienced aircrewmembers, and the pilots had learned to rely on good navigator station keeping in times like this. 'Eleven o'clock and four miles, pilot.'

I, like many navigators, I'm sure, have learned that calling our cellmate at 10:45 or 10:30 relative position often brings a 'come on, nav!' from the front seaters. So for matters of simplicity and avoidance of embarassment we often restrict station keeping interphone calls to rounded-off clock positions.

Somewhere toward the end of the SID we began moving up and sliding out from Lead. As we moved up on Lead, I continued to call the rounded-off 'eleven o'clock and four miles' although we were getting closer to 45° right echelon, or 'ten thirty.'

It was at that time that I also got involved with inflight log work (pre-logging the fix positions and alter-heading entries) and let my radar scope station keeping cross check slow down. Quickly, in what seemed a moment or two, we had moved so that the cell leader was now at or behind our 10 o'clock position. Normally, at a turn point where the lead aircraft would turn into the cell, we as Number-two would delay our turn until Lead passed through our 12'clock position (to avoid excessively cutting him off or being 'belly-up' to him). With an immediately approaching 110° right turn at the SID termination point, and the known position relative to Lead, I realized the cell leader would be crossing in front of us. I quickly notified the pilot who made a fast ten degree left turn to move over behind the lead aircraft. As was the case with any potential conflict in the horizontal plane, we queried Lead about his altitude with hopes of maintaining separation using the vertical plane. Lead's reply indicated we were 1200 feet below him which assured us that, at worst, the lead tanker would cross well over us prior to our starting the turn. Lead called the turn, and within two sweeps of the radar scope I could see Lead converging rapidly on our position.

'Hey, Two, watch out. We just barely missed an airplane.' Lead called a near-miss with an unidentified '707' and warned us to keep a sharp eye as we turned. We started our turn, rolled out, and rejoined on Lead in a near-trail position. It was only seconds later, or was it minutes, that both aircrafts' crews realized what had happened. After our breaking out of the clouds our altimeter, in the Reset mode, placed us roughly 500 feet below cell lead, yet visually we were well above him. Switching the altimeter to Standby produced a 1200 to 1500 indicated altitude difference. Despite our assurance of altitude separation our aircraft had crossed directly in front of the lead tanker with a mere 100 feet clearance. We had been that '707!!!'

We were scheduled to air spare the first refueling and then make a tanker-to-tanker rendezvous for the second air refueling in the same anchor. We elected to exchange cell positions and take the Lead position so as to leave the aircraft with the reliable altimeters in the refueling area for the tanker-to-tanker and subsequent refueling. While refueling we noticed our altimeters, in both modes, differed by as much as 540 feet from the receiver's altimeter.

Following the refueling we contacted our home station, relayed the news of our unreliable altimeters, and checked on the local weather status. Due to rapidly degrading weather conditions at home we elected to recover at a neighboring SAC base with somewhat better weather conditions. Enroute to the base we arranged, through the SAC Command Post, to have an ACE chase plane meet us and escort us down through the weather. The chase rendezvous was made and our recovery was otherwise uneventful.

During the subsequent check of the aircraft pitot-static system it was discovered that a substantial amount of water had collected in the system, probably during that continuous rain the night before the flight. During climb-out it had frozen causing erratic and erroneous altimeter readings.

Each of us involved with that cell formation that day has since spent considerable time questioning what cause (or set of causes) nearly produced the loss of nine lives and two aircraft. Surely the faulty altimeters caused by ice blockage within the pitot-static system of our aircraft was a factor. We had fallen back on altitude separation to keep the airplanes apart, and all indications had been that we would have that separation.

We had discussed on both mission planning day and the day of the flight the need for Lead to forewarn us prior to making a turn 'into the cell.' As we approached the end of the SID we knew of the forthcoming large right turn and should have been more cognizant of the necessity to be at a near-trail position behind Lead at the turn point. During the departure Lead assumed we were behind him; therefore, he only notified us that he was starting his turn. Because we were out of position and to Lead's right we should then have told Lead to delay his turn to allow us to drop back to near-trail.

Another contributing factor, though some may feel it unimportant, was the use of clock positions for crew notification of the relative position of Lead. The difference between eleven o'clock and ten o'clock is 30° of azimuth. Using the rounded-off clock position I would allow Lead to drop behind 45° echelon before I would call out a ten o'clock relative position. The use of degrees in azimuth, as well as being more accurate in indicating what direction to visually search for the other cell member, gives quicker trend information. Had I called out '35° left' followed by '40° left' rather than continuing to round-off to 'eleven o'clock' our pilot would have been more aware that we were sliding up and out in relation to Lead.

But in my mind the major factor, the one that made altitude separation our last hope for safe separation, could have been avoided. Had we continuously monitored our position in relation to Lead and maintained a near-trail position there would have been no conflict within the horizontal plane. You can bet we'll use at most a 5 or 10° left or right echelon position in the future to avoid Lead's jetwash! In cell work, station keeping is still the primary role for navigators in the wingman aircraft. The crew counted on me for trend information concerning Lead's relative position and I had allowed my cross check of radar to slow until it was almost too late to recover.

Because of erroneous altimeters, inaccurate cell position calls, and complacent station keeping a relatively routine cell take-off and departure almost ended in disaster. The faulty altimeters were beyond our control, but we most assuredly could have prevented the lateral conflict. I feel a responsibility to share our near-disaster so as to make other cell fliers aware of the importance of using good cell techniques in order to stay laterally separated. That altitude separation may not be separation at all ! . . . 'Pilot, Lead's at 15° left and 3 miles.'

r&d corner

Strategic Crewstation Design

CMSgt Lawrence F. O'Neil,
HQ SAC/XPHN

Advances in Electronics have by far outpaced growth in airframe or power plant technologies. Consequently, avionics modernization typically occurs one or more times in the lifespan of a major weapon system. In the case of the B-52, many avionics modifications have been made since the weapon system entered the inventory. Historically, human engineering of avionics interfaces and crewstation design occur primarily during system design and acquisition. Unfortunately, human factors considerations have not always received emphasis when minor modifications are made (with installation usually on a space-available basis to minimize cost). As a result, the original "optimal" control/display layout may be compromised as one avionics modification follows another. This often results in reduced efficiency of the crewmember or the "why did they ever put that switch THERE" syndrome. The B-52 is certainly no exception.

The Strategic Avionics Crewstation Design Evaluation Facility (SACDEF) was established under the Human Engineering Division of the Air Force Aerospace Medical Research Laboratory (AMRL) as part of the B-52 Avionics Modernization Program (AMP). Studies have examined offensive and defensive operators' performance with Phase VI ECM, Power Management System, Phase I OAS/CMI modification program, and the B-52G Fire Control System/AFSATCOM interface. The Air Force Aerospace Medical Research Laboratory was first asked to evaluate the workload of the B-52 defensive crewstations because the logistics community responsible for system management had no organic human engineering capability and the applied human factors specialists familiar with the B-52 had long since been reassigned. Based on the success of the AMRL defensive avionics studies, the SACDEF was established to assure continuing human engineering support of planned B-52 avionics modifications (ALQ-155, ALQ-153, ASG-15, OAS/CMI, AMP).

AMRL personnel are intimately familiar with SAC operations, experience levels in the crew force, and the workload imposed by a typical SIOP-like

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SAC Safety NCO

SMSgt William Gajeski, 42d Supply NCO, Loring AFB, is SAC Safety Man of the Month.

SMSgt Gajeski was assigned to the position of Supply Safety NCO in December 1980. Since his assignment as safety NCO, he has reviewed directives and performed self-inspections to insure his unit's compliance. His safety responsibilities encompass over 300 personnel of which many are employed in POL (a highly hazardous work environment), 25 buildings and 50 vehicles. Through constant monitoring of problem areas and coordination with branch supervisors, SMSgt Gajeski has been able to pinpoint deficiencies, make recommendations and keep the unit's mishap experience low. SMSgt Gajeski is a definite asset to SAC and his unit safety program, and is most deserving of recognition as Safety NCO of the Month.

PROFESSIONAL PERFORMERS

Maintenance Airman

SrA Joseph M. Gallihugh, 379th Bomb Wing, Wurtsmith AFB, has been selected as SAC Maintenance Airman of the Month. Airman Gallihugh is assigned to equipment maintenance as a weapons mechanic. A maintenance bay chief, he is responsible for supervising 12 newly assigned workers. He also was one of four SAC maintenance members chosen to attend a technical order verification for the newly designed MHU-173 weapons loading trailer for the air launched cruise missile program. As a result of his performance, he will attend the next technical order verification session which will cover more extensive tasks. SrA Gallihugh has an impressive quality control record and has performed in an outstanding manner during wing quality control and SAC MSET evaluations. As a result of his expertise, he has been a significant contributor to the effective operation of his unit. His initiative and personal achievements make him a valuable member of the SAC maintenance team.

Maintenance Airman of the Year

TSgt Richard A. Fischer, 19th MMS, Robins, AFB, has been named the Strategic Air Command Maintenance Airman of the Year. He reflects the highest standards of dedication and devotion to his unit and command. As NCOIC of the nuclear munitions maintenance section, his performance is exemplary. He personally inspects 100% of all maintenance accomplished on assigned weapons and equipment. He supervises assembly and mating of drop shapes to clip-in assemblies resulting in perfect clip-in system and drop shape performances on every Red Flag exercise. Working with AFLC/AFK, he devised a 15-month schedule forecast which allows identification, analysis and elimination of supply and scheduling problems that would otherwise go unidentified. He developed and implemented one of the most comprehensive and aggressive training programs within the wing. This program coupled with his management and inspection techniques resulted in constant superior performance ratings from higher headquarters inspections. His section maintains the highest maintenance standardizations and evaluation ratings in the 19th BMW. He was selected to head a training augmentation team dispatched to another unit having problems. Serving as the NCOIC of the maintenance and storage branch, he thoroughly assessed the situation and briefed higher headquarters as well as unit personnel on problem areas and immediate solutions. He has received high praise from division and wing commanders for his superior contributions. He consistently displays those qualities most needed in today's Air Force. He is a valuable asset to the SAC maintenance effort and the United States Air Force, and well deserves the General Thomas S. Power award for 1980, as Strategic Air Command Maintenance Airman of the Year.

The CREWMEMBER and MAINTENANCE

Maj Dick Wilson
376th SW

The history of military aviation is filled with stories of the close bond between crewmembers and maintenance personnel. This is particularly true in wartime. Eddie Rickenbacker from his autobiography tells us about his concern that the aircraft be ready and the guns reliable before he went into combat. He soon learned as much about his aircraft as the maintenance personnel who maintained them. World War II and Korea were no different as crewmembers often labored into the night at remote sites to ready their aircraft for the next day's mission.

During a tour in Vietnam, I had occasion to work into the evening on a C-7 which had sustained battle damage at a remote location. As I was laboring over a crow bar, a worried Army sergeant appeared and informed me that his men had spotted an enemy patrol in the nearby hills, and if I wanted to save this airplane, I needed to leave now (with emphasis on the now). We were able to fly that one out, but not before we had performed some minor maintenance. Knowing a little maintenance and how to assess the mechanical status of that C-7, saved some valuable Air Force assets.

So what does wartime history have to do with the modern peacetime Air Force? After all, airplanes are expensive technological wonders compared with the biplanes of World War I. The Air Force pays thousands of dedicated maintenance people to maintain your aircraft in top condition. Your mission is to fly and fight.

All true, yet I can't help but feel that today's crewmembers could learn a lot and increase their value as professionals by taking an interest in their aircraft that goes beyond their specific crew specialty.

When I look back on the early part of my flying experiences, I remember clearly that the last thing I wanted to do was get involved in the maintenance business. "I break them; maintenance fixes em." That feeling was, I believe, held by the majority of my contemporaries. To this day, there is a healthy rivalry between maintenance and operations. Attend any SAC wing's standup, and I can almost guarantee that, even as operations sits on one side of the table and maintenance on the other, there is the we/they relationship which subtly pervades the thinking at that level and ultimately finds its way down to the youngest 2 Lt on a crew. I don't mean to imply that this feeling is overtly negative or destructive. I take it for what it is — good natured, competitive rivalry. What it isn't, however, is a motivation to crews to get involved with the maintenance of their aircraft. I would like to suggest that knowing how to service your plane, and prepare it for flight is valuable knowledge. Knowing a little basic supply system operation can also help you determine how long you may have to wait for that black box to be replaced which, in turn, can help you decide whether you will have to adjust your takeoff time and reschedule the ARCT. These are the kinds of information and experiences which go a long way toward making you the complete crewmember.

My SAC duties have taken me from Greenland to Australia. On some of these missions, I was accompanied by a crew chief. On several, I wasn't. In the case of Australia, I was the maintenance supervisor. With the expanded responsibilities which SAC has undertaken in recent years, you may well find yourself in some far corner of the globe with a mission conducted under time sensitive conditions. It may call for your ability not only to fly the plane, navigate in strange places, etc., but you may also have a chance to display your expertise at starting a power unit, refuel your aircraft or accurately assess your aircraft maintenance status under less than ideal conditions.

Earlier I alluded to the fact that this is the "peacetime Air Force." Like an opiate, that phrase can produce a certain mindset which can lead, if we all partake, to a reduction in skill and dedication to responsibilities which we have been sworn to uphold. Where is the sense of urgency in the term "peacetime Air Force?"

Next time you study your EWO mission, think about the conditions you may be operating under if and when the horn goes off for real. I don't have to go into great detail for you to know that the maintenance support that you have become accustomed to may not be there in all phases of your EWO mission. It will probably take more than basic crew position knowledge to insure the success of your mission. Are you ready for that challenge?

Many SAC bases have had varying degrees of training established for aircrews which gave them a basic orientation in maintenance. This is a step in the right direction. SAC's ADSAC program is another more in-depth way for motivated crewmembers to gain insight into the maintenance business. The rated supplement was, for years, a great way to learn maintenance. That knowledge is something that those who were fortunate to participate in can and should share with crews when they return to cockpit duties. Unfortunately, the rated supplement drawdown no longer affords large numbers of operations people the opportunity to serve in a maintenance AFSC.

I'm not telling you to become a maintenance weeny. I'm not asking you to be a maintenance expert. I am suggesting that as you broaden your knowledge and motivate others to do the same, your productivity will be enhanced and your readiness increased. Knowing a little bit about what your comrades in aircraft maintenance are up to will go a long way toward preparing you for the future. As they say, the future is now.

There may not be any formal training opportunities available to you. You may have to have the crew chief show you. Ask him or her how to refuel your aircraft. These maintenance people are dedicated and will bend over backwards for anyone who shows the desire to learn. A little time well spent now could be the difference between success or failure of the SAC mission; the difference between returning or not returning.

AVIATION FUEL CONSERVATION

— an on-going program

Capt Jeff Shiffer
325 BMS, Fairchild AFB

As the price of oil continues its upward spiral, it is essential that all levels of the Air Force take aggressive steps to reduce fuel consumption. While the airlines take extra-ordinary steps such as reducing the amounts of drinking water carried aboard and changing out carpets on their aircraft to reduce aircraft weights and thus improve fuel consumption, it is our obligation to do what we can in the trenches to make whatever savings are possible. It is not inconceivable that the price of oil could reach $50.00 a barrel within the near future. Ponder that one for a few moments! This article will offer a *"game plan"* and suggestions on how a unit can develop a meaningful and workable fuel conservation program.

Aviation fuel conservation began to receive command emphasis in 1979 when the prospect of increased fuel costs loomed on the horizon. During Fuel Conservation Week in October 1979 numerous fuel saving suggestions were submitted from the field which resulted in the *"Aircrew Guide to Fuel Conservation"* with cover letter by the then SAC/DO Maj Gen Pringle dated 8 January 1980. In February of 1980 fuel conservation drew even more attention when the anticipated increase in aviation fuel became a reality. The price of JP-4 soared from $.56 to $1.18 per gallon. This increase in fuel costs raised the average cost of operating a B-52G to almost $6,000 per hour and a KC-135 to nearly $3,000 per hour. The need to reduce fuel consumption received a new priority. Individual units began to gin-up fuel conservation programs based on the peculiarities of each organization.

The primary guidance for establishing a fuel conservation program has come from CEVG. The Combat Evaluation Group cross-feed reports indicate that the following items are a must:

1. Specific guidance for aircrews describing procedures and techniques for fuel conservation. Many units have established DO OIs. Others have developed handouts.
2. Missions planned and flown with minimum deadhead time and direct routing.
3. Missions planned and flown at optimum altitudes and best range airspeeds.
4. Optimum fuel loads.
5. Effective use of enroute descents.
6. Minimum use of drag devices for multiple approaches.
7. Aircrew attention to the specific guidelines established for fuel conservation.

But do these items in total constitute an active, on-going fuel conservation program?

Let's examine what constitutes a program. A program is a type of plan. It is the methodology — the policies, procedures, and rules which guide the members of an organization toward a common course of action to obtain the desired objective or goal. In other words, a program is a plan with guidelines to reach a specific objective.

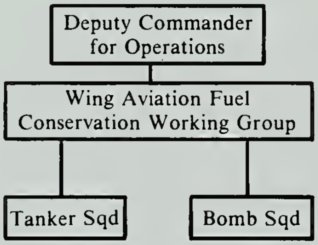
THE OBJECTIVE. What is the goal of your fuel conservation program? To simply say it is to reduce fuel consumption is not enough. You could reduce fuel consumption by eliminating all traffic pattern operations except the termination landing and meet your goal. Unrealistic, YES! Training is important. The point is to establish a realistic objective which can be obtained within the constraints of your particular operation. Identify those constraints before establishing your final objective. Next, quantify your objective. How much can fuel consumption be reduced in your unit? Five percent? Ten percent? Twenty percent? Quantifying your goal will give you a means of measuring your progress. Finally, establish a deadline, or suspense. This will also aid you in measuring your progress over time. Your final objective then should read something like this:

> OBJECTIVE: To reduce fuel consumption by 15% by 1 August 1981 while maximizing training accomplishments and flying hour allocation insuring a high state of unit readiness.

THE PLAN. The plan involves determining the approach necessary to meet the objective. We know what our objective is and we know where we are today. The problem is to determine HOW we get from point A to point B. This involves a careful analysis of all the alternative solutions and selection of the best solution. It also involves deciding WHO does WHAT.

The "*who*" is very important and may have direct bearing on how we get from point A to point B. Someone must be in charge of the program. It is essential that someone be designated to coordinate activities of the unit, especially if the unit is composed of two or more squadrons. Many fuel conservation alternatives can only be accomplished at the Wing level. Therefore, a fuel conservation officer appointed by the Deputy Commander for Operations to act as the single point of contact for all unit fuel conservation matters may prove best. Next, formulate a working group. The working group should be chaired by the appointed fuel conservation officer and comprised of representatives from the TAC squadrons, DOT, DOV, and MA as a minimum. The structure then, would look something like the chart in Figure 1.

FIGURE 1.


Deputy Commander for Operations
Wing Aviation Fuel Conservation Working Group
Tanker Sqd
Bomb Sqd

This group will provide a cross-section of all the players involved in the formulation of policy and recommended procedures for fuel conservation measures. In this way all levels of the organization and all agencies, from the Deputy Commander for Operations to the aircrew member, are integrated for a total effort.

The total effort involves "what" is to be done, and as indicated by the organizational structure will center around the Wing Aviation Fuel Conservation working group. This group will:

1. act as a liaison between squadron and staff agencies
2. evaluate proposed fuel conservation measures
3. make recommendations to Wing/DO
4. monitor squadron participation and progress

Additional activities include publication of a monthly fuel conservation newsletter and semi-annual publicity campaigns. Periodic meetings, monthly or quarterly, to review existing fuel conservation measures and evaluate new ideas should promote an active, on-going aviation fuel conservation program. As a minimum, this group must develop an extensive Operating Instruction (OI). Operating instructions are directive in nature, thus getting our attention. Recommended procedures, suggested fuel conservation practices, and fuel conservation guides are all just what they say: recommended, suggested, and guides. They have no associated authority and therefore are not necessarily adhered to by aircrews as they would be if directed by the Deputy Commander for Operations in the form of an Operating Instruction. The OI should direct that missions be planned and flown with minimum deadhead time and direct routing whenever possible, and be planned and flown at optimum altitudes and best range airspeeds. Missions must also be planned with optimum fuel loads, and enroute descents must be effectively utilized when possible, with minimum use of drag devices for multiple approaches, etc.

Now, with basic direction provided, the burden will naturally fall on the user — the aircrew member. It is up to the crews to make the best use of the techniques and practices to minimize fuel usage. Fuel conservation and fuel conservation techniques and practices have been stressed extensively in recent months. I would venture to say that almost 100% of SAC crewmembers have *"gotten the word."* Yet one distressing comment has surfaced more than once from CEVG cross-feed reports — *"comprehensive guidance has been provided but the aircrews demonstrated limited interest in fuel conservation practices."*

Fuel conservation is an attitude. An attitude which, if negative, can only be changed through evidence of positive action. Perhaps that Operating Instruction just isn't enough to convince Capt Ace Crewmember that everyone at all levels of command is genuinely interested in using less JP-4. Perhaps in order to be educated he needs to see action — action which could be provided by a Wing Aviation Fuel Conservation Working Group supporting a strong, aggressive fuel conservation program with a determined objective and a plan to reach that objective. If the fuel conservation program is to be successful, objectives must be determined, plans detailed, and the program must be executed with conviction at all levels. Fuel conservation will be with us for a long time and is still in its infancy. There's plenty of room out there in the field for the crewmember with a little initiative to jump in with both feet and develop for your unit the best aviation fuel conservation program in SAC.

Driving a 300 Mile Flight Line

2LT Walter B. Presley
90th SMW, F E Warren AFB

When was the last time you asked someone to drive a 300 mile round trip and do their job in just ONE day? Did they have to drive on snow covered, icy, or muddy roads? Finally, did you ask them to do this approximately every other day? This is one of the greatest challenges to missile commanders. All but one of our Minuteman bases are in the northern tier of the United States. Changing weather, especially during winter, demands alert drivers at all times. A split second is all it takes to lose concentration and have an accident.

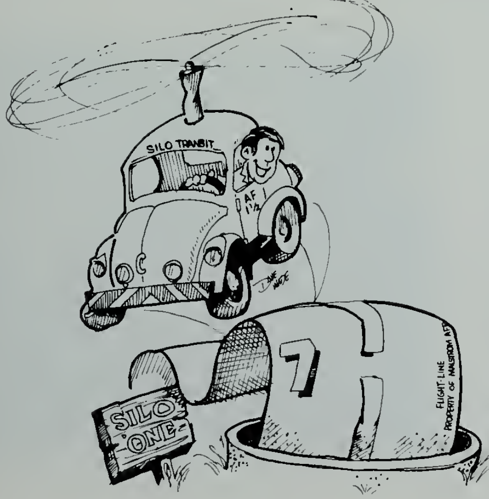
Vehicle rollovers are our major concern. Personnel at Minuteman bases drive on many dirt roads, which can be tricky when wet or snowy. Night driving is another hazard. Both conditions are prime factors in vehicle rollovers. In calendar year 1980, one missile base had seven rollovers. The combined mileage for the year was approximately 6.1 million. This averages to about one rollover every 871 thousand driving miles. This figure may sound good, but we must strive for NO vehicle rollovers.

Here are things to consider for rollover prevention. Our vehicle fleet varies in size and age. Most are one to seven years old, and some special purpose vehicles are much older. The sizes run from small economy cars to tractor-trailer rigs. Maintain these vehicles in top condition. With changing weather and driving terrain, the operator shouldn't need to worry about mechanical problems. The driver and passengers can minimize this worry by proper pre-operational checks before departing base.

Our primary work force is 18 to 35 years old. Statistically, this age group is accident prone. Impress upon your missile folks the reality of local traffic hazards. They must know that people, equipment, and their jobs will suffer in the event of an accident. Supervisors must demand driver safety and educate their people on the constant driving hazards in the field. They should tell their workers about the "how and whys" of other accidents. There are many creative ways to distribute accident prevention information. But, the biggest responsibility lies with YOU, the driver. All the education in the world won't help unless you're willing to put what you've learned into practice. Everyone can develop safe driving habits when they:

- GET adequate rest before dispatch.
- DO thorough pre-operational vehicle checkouts.
- KEEP safety observers alert.
- USE seatbelts.
- DON'T let anyone who isn't qualified drive a vehicle.
- DON'T listen to "WAR STORIES" of others and try to duplicate what they did.

Your driving and job safety are paramount. Good judgement and careful decisions will not only help you; they will benefit the people with you and the Air Force.



341st

20th Anniversary

Have you ever been stationed at Malmstrom AFB, Montana? If so, you will want to be a part of the 341st SMW's 20th Anniversary celebration on 10 and 11 July 1981. The event will include the grand opening of our museum: a facility dedicated to fostering a greater awareness of our wing's heritage for present and future generations. If you were stationed at Malmstrom during the past 20 years, we would appreciate your loaning or donating memorabilia that could be housed in the museum. Of course, we also encourage you to attend our wing's open house, *"Big Sky Day,"* which will be on 11 July. The Navy's Aerial Demonstration Team, the "Blue Angels," and the Air Force Academy's Jump Team will perform. In addition, we will feature base tours, static displays of many American and Canadian aircraft, a parade, a family fun run and much more. Please come and help us celebrate. For more information contact: Capt Byron Gold, 341 SMW/CCE, Malmstrom AFB, MT 59402. Telephone (406) 731-3413/ Autovon 632-3413.

MINUTEMAN CREW

The 341st SMW Crew R-008 is SAC Missile Combat Crew of the Month. Crewmembers include: 1Lt Richard E. Prins, MCCC, and 2Lt Stephen P. Dehoff, DMCCC.

On alert at Bravo LCC, Crew R-008 displayed outstanding judgment, system knowledge and leadership during a critical situation. The crew had finished a portion of a standardization evaluation when a maintenance team arrived to work on the topside standby diesel generator. For several hours, the crew coordinated with the team. Then the facility manager reported the maintenance team chief had sustained a severe electrical shock, was unconscious and suffering convulsions. The crew took action to insure appropriate first aid measures were taken and set up a phone patch between the LCC, flight surgeon and command post to relay medical information. A helicopter was requested by the crew for evacuation of the victim.

Crew R-008's actions during this incident and their daily performance are deserving of recognition as the SAC Minuteman Crew of the Month.

PROFESSIONAL PERFORMERS

TITAN CREW

Crew E-081, 381st SMW, received a call from a maintenance team working in the silo equipment area on level 6. The maintenance team explained that they had been working with a compressed gas bottle containing dimethylamine. The bottle developed a leak and the team was unable to stop it. The crew commander directed the maintenance team to evacuate level 6, stop at level 4 and evacuate the team there and then return to the control center. The crew initiated the emergency action checklist and a missile potential hazard team was formed. A response team with appropriate safety equipment was dispatched from the base by helicopter. When the team arrived on complex, they were briefed by the crew commander and dispatched to the silo to retrieve the bottle and render it safe. Later the response team reentered the silo area to take air samples. They found that the hazard no longer existed and the hazard response was terminated. The calm and timely efforts of the crew protected the lives and health of the 21 personnel on complex and resolved a potentially hazardous situation in an outstanding manner. Crewmembers include: MCCC Capt John J. Carlson; DMCCC 2Lt David L. Bridges; MSAT SrA Shawn F. Fair; and MFT SrA Daryl Morgan.

BIG INSTRUMENT

Solid State ILS Revisited

Captains James M. Sullivan and John C. Conley
1st Combat Evaluation Group,
Barksdale AFB, Louisiana

Editor's Note: *This is reprint of a 1979 Combat Crew article which reflects changes to procedures and responds to an increasing number of unit questions about solid state ILS system.*

"Reno 62 is four miles from Elm Grove. Turn right heading 290. Maintain 2000 feet until established on the localizer. Cleared for ILS Runway 32 approach."

This type of clearance for an ILS approach has become commonplace for most of us since the conversion to solid state ILS equipment resulted in the demise of the PAR at most bases. While at first glance the ILS approach seems relatively easy to understand and fly, actual execution of the approach can become a difficult maneuver because of inherent idiosyncracies of the system and inflight procedures. Therefore, a brief review of the ILS, equipment, procedures, and techniques will sharpen your knowledge on how you can use the ILS approach to crack that low visibility arrival weather at your destination base.

EQUIPMENT

Let's first consider some idiosyncracies of the ILS equipment itself. The solid state equipment is a highly reliable guidance system which should prove to be your most valuable approach aid. Some pilots have noted, however, that course guidance seems extremely sensitive and more difficult to maintain. Runway length and the unique "tailored" localizer are the two factors determining course width and cockpit instrument sensitivity.

Course width for a solid state ILS may vary within the limits of 3° to 6°, with the beam width normally "tailored" to provide a 700′ lateral width at the runway threshold (Fig 1). The exact course width for a solid state ILS depends on the runway length. The longer the runway, the narrower the beam width (Fig 2). For a 12,300′ runway with the localizer antenna 1000′ beyond the end of the runway, the course width is now 3°. One dot deflection would be 3/4° off centerline. Therefore, course guidance to a long runway has become more sensitive than it was with our previous ILS equipment.

Obviously the tailored course has an impact on the sensitivity of the CDI and when it comes off the edge of the case during your intercept of the localizer course. Because "case break" will be different for different runway lengths, you must be prepared for the ensuing turn from a vector heading to intercept the final course. Even with good preparation, you may overshoot the final course and have to correct back. Any large overshoots will affect your descent considerations since AFM 51-37 requires you to be "established on a segment of the published routing or instrument approach procedure" before departing your last assigned altitude for the next altitude restriction. Therefore, the pilot must know his position relative to the final course, be alert, and use smooth, precise control inputs to execute the sensitive solid state ILS approach.

The *Airman's Information Manual* (AIM) states that the "localizer provides course guidance throughout the descent path to the runway threshold from a distance of 18 NM from the antenna between an altitude of 1000′ above the highest terrain along the course line and 4500′ above the elevation of the antenna site." The glide slope, however, is normally usable to a distance of 10 NM. AFM 55-9 (TERPS) states that the optimum glide path for a military ILS is 2.5° and should not be greater than 3° nor less than 2°. Likewise, if

VASI is installed on the ILS landing runway, its glide slope angle and Runway Point of Intercept (RPI) should coincide. This could be very important to remember when transitioning to visual cues for landing. Be aware, however, that some bases have VASI's designed for special mission or performance aircraft and these systems may not coincide with the ILS. Check your IFR supplement to determine if such special conditions exist.

FLYING THE APPROACH

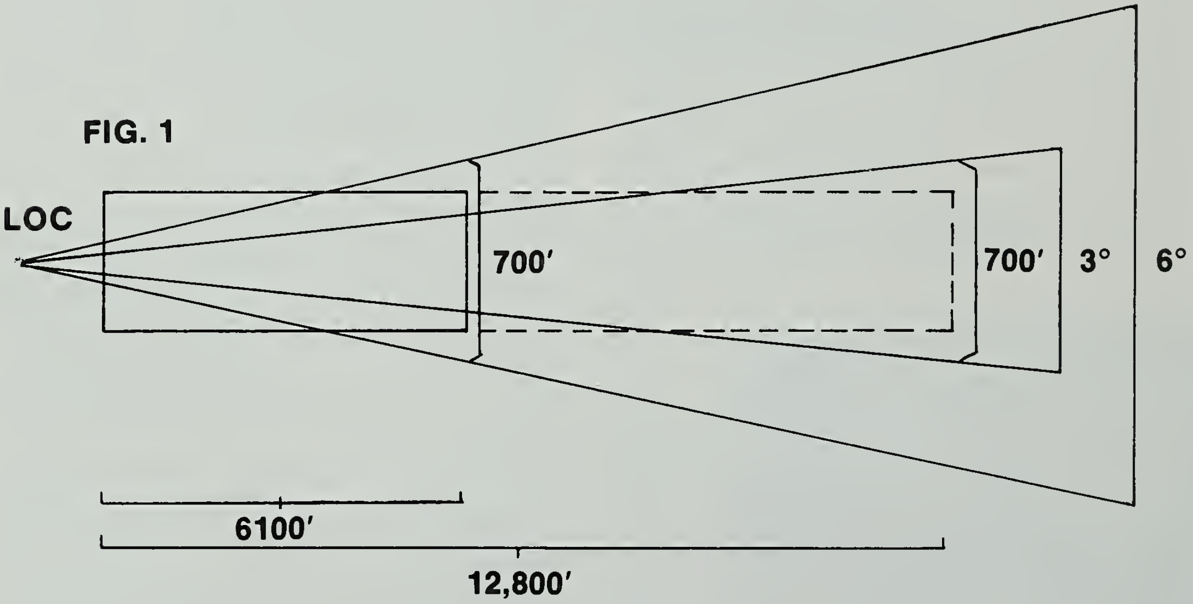
When flying the ILS, pilots may transition to the final approach using a published approach procedure or radar vectors. Flight manuals prescribe equipment operating instructions for your particular aircraft; however, AFM 51-37 provides general guidelines for all pilots.

After you have tuned and identified the proper frequency, continue to monitor the identifier throughout the approach and set the published localizer front course in the course selector window prior to attempting to intercept the localizer. Program your flight director as specified in your flight manual and use all means available (Nav Aids and Radar) to remain oriented to the localizer course.

If the pilot is flying a published procedure, he should maintain published altitudes until intercepting the glide path. If being radar vectored, maintain the last assigned altitude until established on a segment of the published routing or instrument approach procedure. The pilot should compute the rate of descent required to maintain the glide path and smoothly adjust pitch to establish the descent as he intercepts the glide path. One technique is to lower the aircraft nose the number of degrees equal to that of the glide path; i.e., for a 2.5° glide path, reduce pitch 2½° and adjust power or drag to maintain final approach airspeed. For a given configuration, adjusting a control instrument such as fuel flow to a target value is one way to establish required power.

Throughout the approach, keep power and control movements small (within 1° of pitch and 5° of heading recommended). If employing command steering bars, constantly crosscheck the "raw data" provided by the CDI and GSI and remember that as you fly closer to the runway, course/glidepath airspace narrows and smaller pitch and bank corrections will be required for any given instrument deflections.

FIG. 1



BIG "I"

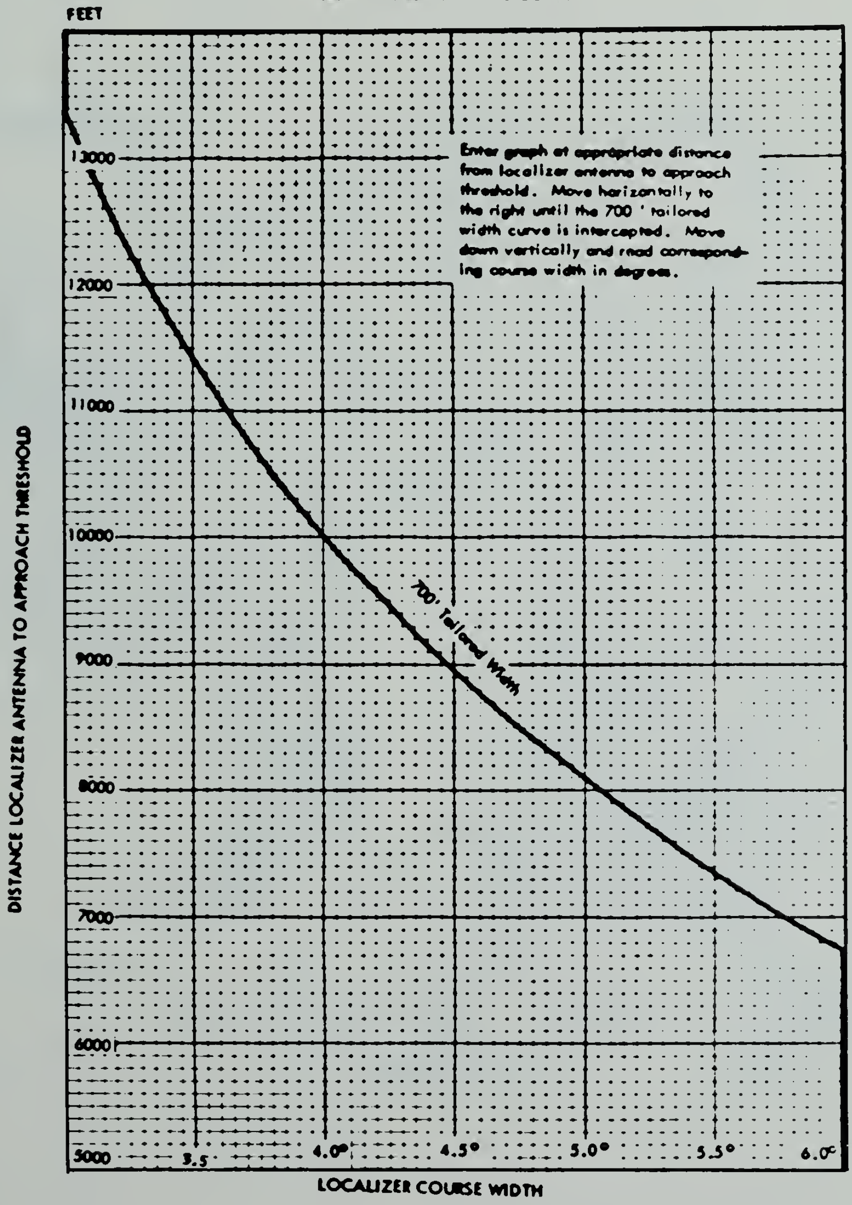
WHAT IF — —?

The old question of "What if" and "What now" should be in the back of every pilot's mind when flying any approach and he must be aware of possible equipment malfunctions which might require expeditious action. If glide slope indications become unreliable, will you continue with a localizer approach? What about timing for a localizer — did you remember to "hack your clock"? What are the weather conditions and is the aircraft being radar monitored?

Furthermore, pilots must be aware of their options and procedures in the event of other malfunctions. If the localizer course becomes unreliable or the CDI is fully deflected on final approach, abandon the approach. If the GSI indicates more than one dot "fly up" or two dots "fly down," do not descend below localizer minimums unless the glide slope is recaptured within these tolerances.

A well executed ILS could mean the difference between a safe landing and a weather diversion. If pilots understand the ground and airborne equipment and are familiar with ILS and ATC procedures, half the battle is won. AFM 51-37 is an aviation "best seller." Review it often and have a safe flight.

FLIGHT INSPECTION PROCEDURES



Enter graph at appropriate distance from localizer antenna to approach threshold. Move horizontally to the right until the 700' tailored width curve is intercepted. Move down vertically and read corresponding course width in degrees.

DAVE WADE

SECOND CHANCE

Capt Chester F. Camp
740 SMS, Minot AFB

Crewmembers have always wondered about the strict standards that SAC demands of their missile combat crewmembers. This is an age old problem that all professional military people have confronted throughout history. A short story can illustrate the point about the lack of understanding of strict preparedness standards.

A Roman soldier was ordered to wear his sword while constructing a defensive position. The day was hot plus the working conditions were difficult and with each passing hour the sword got heavier. Around noon, the soldier decided to take off his sword because the enemy was miles away and no one would notice. It happened that the Roman Army commander was inspecting this section of the defenses and noticed the soldier was not wearing his sword. The commander asked the soldier, *"Why are you not wearing your sword?"* The soldier replied, *"Sir, the day is hot, the work routine, and the enemy is far away and the sword is not needed to dig this ditch."* Upon this reply, the Roman Army commander ordered the soldier executed on the spot, stating that had a surprise attack occurred, this soldier would not have been able to fight without his sword, and therefore the soldier was a menace to his comrades.

In 1980, of course, civilized nations seldom execute crewmembers that do not meet the strict standards that are required. Nevertheless, SAC crewmembers must be able to fight a war on a moment's notice. Most missile crewmembers can relate to the Roman soldier's position about taking off his sword. Our work is routine with little variation in daily operations. Like the Roman soldier, crewmembers do not always consider the full spectrum of the situation.

SAC, like the Roman Army commander must consider the whole spectrum concerning preparedness. War is not an infinite mass of minor events that go uncontrolled by human influence. War consists of great decisive actions, each of which needs to be handled individually. The Roman commander had to guard against mistakes which are a menace in the field, where experience is so dearly bought. A Roman soldier lost his life, but the commander may have saved an army. SAC must guard against mistakes, but does not have the luxury of absorbing a menace in the field. Experience that is so dearly bought costs lives and resources that can lose a war. Not only is SAC's survival at stake, but that of the United States. Survival in the sense that we remain a dynamic nation contributing to civilization.

We train constantly to improve our level of proficiency in the weapon system and emergency war orders. The purpose is not to bore or insult the intelligence of crewmembers. The reason is to gain the advantage of a routine. Constant practice leads to quick, precise, reliable leadership, minimizes conflict, and improves organization workflow. Routine gives the crewmember the necessary skills needed to do the job in a combat situation.

The only difference that distinguished a Roman training field and battle field was the color red. We can understand the reason for strict standards in performance and the importance of routine. Rome trained her armies to react on the battle field as they were taught on the practice fields. SAC must rely on the crewmember to do the job which is: combat. The better we perform this task the safer our nation will be. Deterrence must be supported by a war fighting capability with the resolve to use it when warranted. We, as SAC crewmembers, must think about these ideas for if we fail, **there will be no second chance.**

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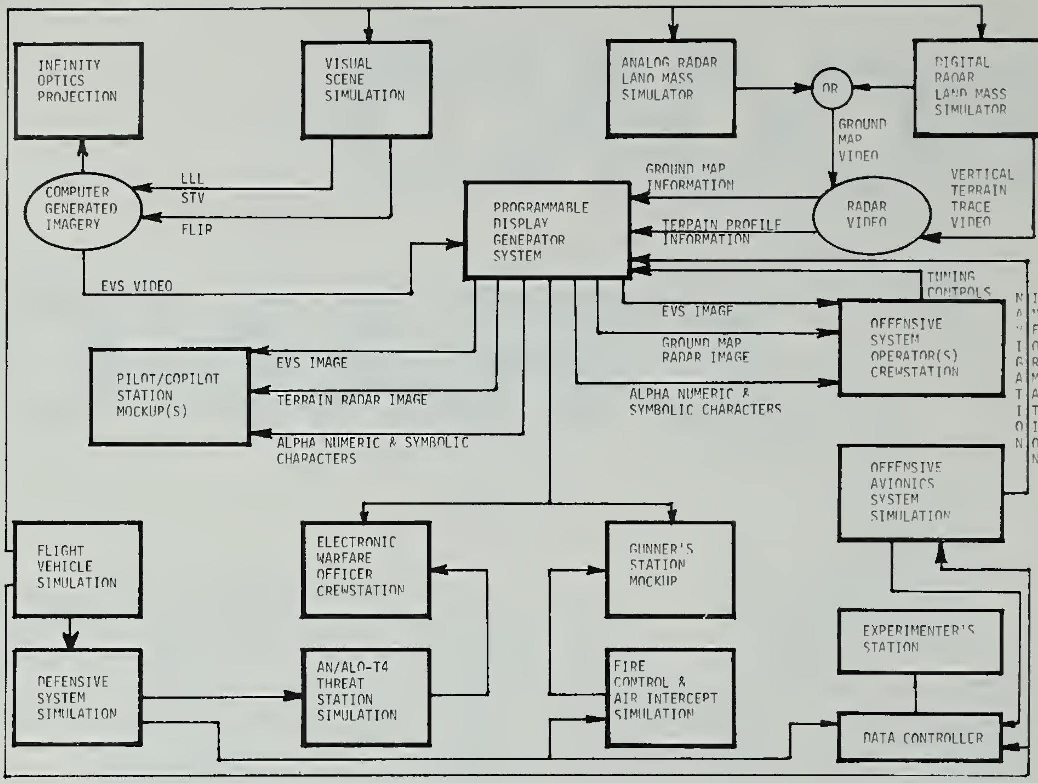

INFINITY OPTICS PROJECTION
VISUAL SCENE SIMULATION
ANALOG RADAR LAND MASS SIMULATOR
OR
DIGITAL RADAR LAND MASS SIMULATOR
GROUND MAP VIDEO
COMPUTER GENERATED IMAGERY
LLL
STV
FLIR
GROUND MAP INFORMATION
PROGRAMMABLE DISPLAY GENERATOR SYSTEM
RADAR VIDEO
VERTICAL TERRAIN TRACE VIDEO
TERRAIN PROFILE INFORMATION
EVS VIDEO
TIMING CONTROLS
NAVIGATION
INFORMATION
EVS IMAGE
OFFENSIVE SYSTEM OPERATOR(S) CREWSTATION
GROUND MAP RADAR IMAGE
ALPHA NUMERIC & SYMBOLIC CHARACTERS
PILOT/COPILOT STATION MOCKUP(S)
EVS IMAGE
TERRAIN RADAR IMAGE
ALPHA NUMERIC & SYMBOLIC CHARACTERS
OFFENSIVE AVIONICS SYSTEM SIMULATION
FLIGHT VEHICLE SIMULATION
ELECTRONIC WARFARE OFFICER CREWSTATION
GUNNER'S STATION MOCKUP
EXPERIMENTER'S STATION
DEFENSIVE SYSTEM SIMULATION
AN/ALQ-T4 THREAT STATION SIMULATION
FIRE CONTROL & AIR INTERCEPT SIMULATION
DATA CONTROLLER

STRATEGIC AVIONICS CREWSTATION DESIGN EVALUATION FACILITY

mission. They have established a fully integrated combat mission simulation capability that is modifiable and adaptable to new crewstation design and layout. The figure illustrates the basic architecture of SACDEF. Not shown are the instrumentation interfaces to permit computer monitoring of all electronic variables that impact the subject crew positions plus video and audio monitoring/recording of each subject. This permits engineering change proposal (ECP) evaluation, tactics evaluation, and human engineering of proposed avionics modifications.

The SACDEF also provides additional benefits. First, since AMRl has no vested interest in the system, its acquisition, its maintenance, or its utilization upon deployment, assessments can be made from a relatively objective viewpoint. Second, when SACDEF develops a new or modified system according to contractor design development specifications parallel with the contractor development, the Air Force accrues the additional advantage of cross-checking system engineering design and implementation prior to flight testing, as OAS experience demonstrates. Third, SACDEF permits focusing flight testing on known problem areas. Fourth, availability of an aircraft-like configuration prior to flight test or training device development facilitates instructional system development. Fifth, SACDEF maintains current B-52 crewstation configuration, permitting evaluation of the human factors impact of many small changes affecting strategic crewstation design. Sixth, although SAC provides combat ready crewmembers as the experimental subjects, selection of the subject is done by AMRL and subject anonymity is assured. This precludes systematic biases in the data and assures candid evaluation of equipment design/layout by the subjects. The result is specific constructive recommendations, suggesting appropriate corrective action for any discrepancies identified in the evaluation of proposed avionics modifications.

When human factors problems fail to be addressed, are addressed as a superficial man-machine interface problem, or get assigned to personnel not familiar with the system/mission context, significant deficiencies can emerge during operation. Due to the cost of retrofit, even if the deficiencies are recognized, they are rarely corrected. Crews must employ "work around" procedures which are typically inefficient and sometimes ineffective. This adds to the workload burden and may compromise survival under combat conditions. Avoiding such consequences requires a systematic approach to human factors as an integral part of system engineering activities during the life cycle of a weapon system. Future strategic crewstation design changes will receive this needed attention to human engineering design criteria. The result will be a better weapon system managed more effectively by the combat crew.

continued from page 7

Loadmasters in other commands are required to attend approximately fifteen weeks of training in a formal technical school, and four to six months of "hands-on" training in their respective aircraft. Boom operators do not receive this extensive training, yet they are required to perform the same duties of cargo/passenger handling. Therefore, the training that the boom operators do receive from Combat Crew Training, Continuation Training, Central Flight Instructor Course (CFIC) and Ground Training must not be taken lightly. Boom Operators must take even more advantage of and be extremely receptive to the training received.

Through feedback received from CFIC boom operator candidates at Castle AFB, it is evident that there are some boom operators who are not knowledgeable of the training requirements. Who suffers: the boom operator, aircraft commander, SAC, Air Force or all four?

It is unquestionably easier to *"sign on the dotted line"* of a TAPR, than to accomplish the training requirements. It also would have been easier for Noah to cut corners, forget about the window, and not bring along a dove, much less two. After all, there wasn't a cloud in the sky. Sure the example of Noah can not compare to just simply *"signing on a dotted line,"* but the point is well taken.

Even though boom operators have the aid of logistics, they are still responsible for supervising the loading and unloading of cargo and passengers. Even more significant is the boom operator's role during SAC's *"Contingency Generations."*

On the contingency exercises, cargo and passenger loads are already pre-determined and are loaded by augmented loading teams. These teams consist of augmentees from various AFSC's with minimal knowledge of the aircraft and cargo/passenger loading procedures. This places a great deal of responsibility on the boom operator's shoulders. They have to supervise the loading, securing and unloading of cargo handled by individuals with limited knowledge of these procedures. Again, training becomes increasingly important for the boom operator.

Each unit has the responsibility to select the most qualified, experienced and knowledgeable instructor boom operator as the Unit Cargo Loading Manager.

The Unit Cargo Loading Manager must understand his responsibilities and be willing to carry them out if he or she is going to have an effective program. These responsibilities include developing lesson plans, coordinating scheduling requirements for training with applicable staff agencies, developing realistic and "local mission" cargo/passenger loads on the SAC Form 84, maintaining student records and conducting cargo/passenger loading seminars.

To ensure the boom operators are receiving the proper training in cargo loading, they must familiarize themselves with the areas that they are held responsible for as outlined in SACR 50-24, Vol III. Briefly, this includes maintaining proficiency in cargo and passenger loading operations, providing materials normally used on operational missions (including required manuals and all applicable forms), notifying CLT Managers of selected options of Phase I and Phase II training, (qualified boom operators have the option of bypassing Phase I and Phase II training depending upon previous experience and proficiency level), and supplying feedback on the quality of training and its effectiveness.

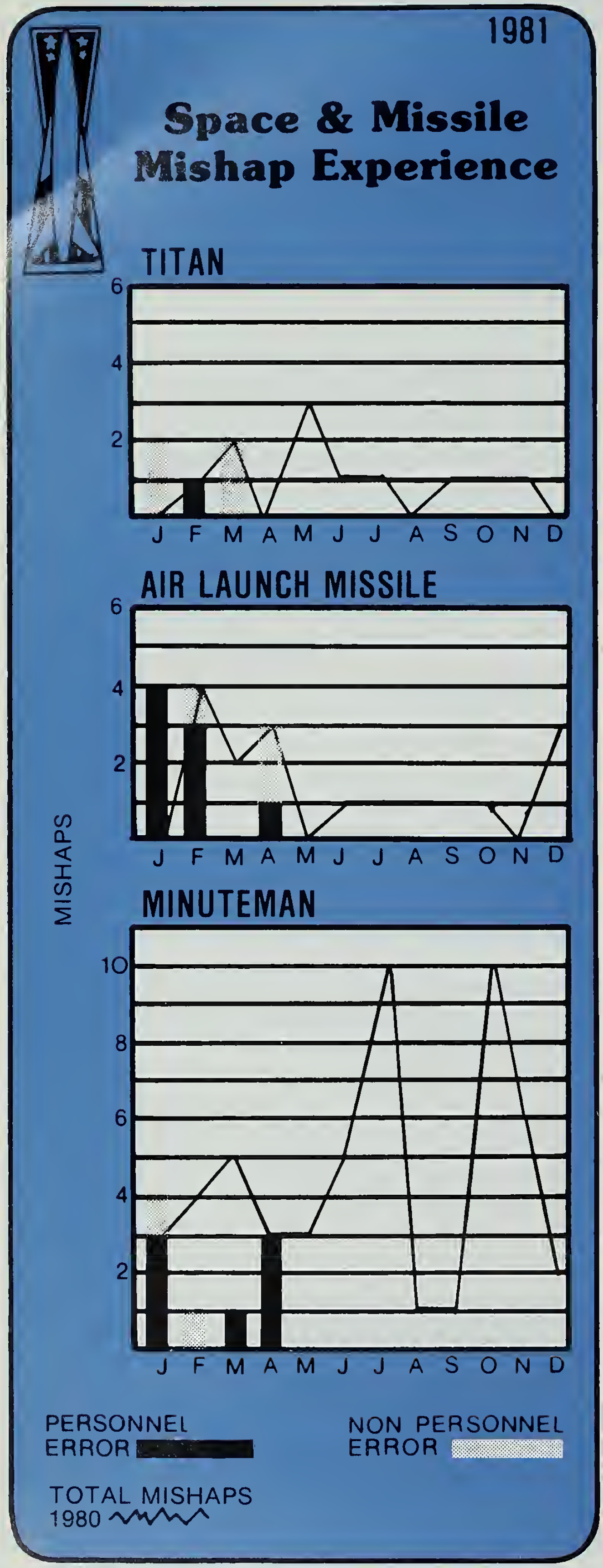
Keep in mind the boom operator and aircraft commander are jointly responsible for the cargo and passengers being correctly loaded aboard the aircraft. Remember KC-135 aircraft commanders do not receive a formal training course in cargo/passenger loading and unloading procedures. They rely on the boom operator's expertise. Lack of proficiency is easily noticed. Do not create an unsafe condition.

In summary it takes the cooperation of the wing cargo/passenger loading managers, cargo/passenger loading instructors and each boom operator if there is going to be an effective training program that will insure the proficiency of each boom operator. If a boom operator is efficient, he or she will surely be recognized for their effort and will possibly be rewarded with that next stripe. Surely, Noah would have agreed that a stripe on the sleeve is better than two on the ark.

REFERENCES

Chubb, Gerald P. and Brisby, Johnny M., *B-52G/H Offensive Avionics System Evaluation,* AFAMRL TR- (in draft).

Sharp, Earl D. and Chubb, Gerald P., *The Nature of Navigator Crew Duties on a B-52 Mission,* AFAMRL-TR-78-9, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio.



Missile Mishaps

HIGH WINDS, BEWARE!

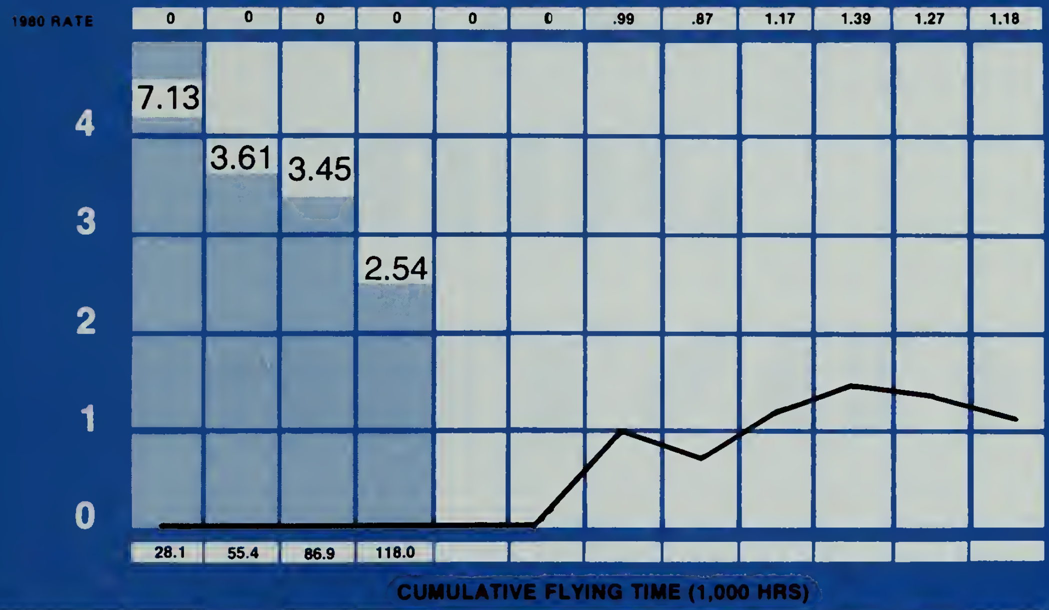
An MMT team was removing a launch tube environmental cover. As it was moved from the launch tube area equipment, lanyards were disconnected when the cover was moved further away from the launch tube area. Four team members were lifting the cover when a gust of wind caught the cover and ripped it from the hands of the team. It then struck a parked vehicle causing extensive damage.

STRAP RACHET

While preparing for download, the team positioned the trailer under the missile with the missile handling fixture in place. All team members failed to see the aft tie-down ratchet on the aft edge of the MMU-125/E pan. When the pan was mated to the missile, a tear to the outer insulation of the missile resulted. The rocket motor assembly was rejected from service.

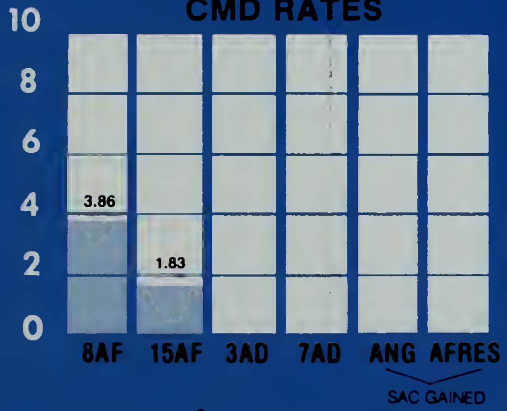
1981 Flying Safety Rate

SAC CLASS A MISHAP RATE (PER 100,000 FLYING HRS)



MISHAPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1980	0	0	0	0	0	0	2	0	1	1	0	0
1981	2	0	1	0								

1981 SUBORDINATE CMD RATES



LEGEND — = 1980 RATE (SAC)
+ = ANG
• = AFRES

MISHAP STATUS

KC-135 A	JAN '81
FB-111A	JAN '81
RC-135S	MAR '81

THE REALITY of JOB CONTROL

Sgt Vicki Rice
381st SMW, McConnell AFB

You have felt at one time or another that job control's job is to devise means of complicating the lives of maintenance teams. Often malfunctions occur which require technicians to work beyond normal hours on a complex or to be diverted to another complex. In all cases, these malfunctions pose very real threats to the mission of the Titan II. Few technicians realize job control would like nothing better than to return every team back to base as soon as possible since this would reduce their already broad realm of responsibility.

The foremost responsibility of job control is to continually monitor the status of all equipment at each of the 18 missile complexes. When a malfunction occurs during the absence of maintenance personnel, job control must identify the malfunction, assess the priority, and determine if an unscheduled or prescheduled dispatch is required. On top of this constant demand, is the responsibility job control has for each of the approximately 75 to 80 technicians that are dispatched to complexes per duty day. While on complex, each team must report any unusual or hazardous conditions affecting equipment or personnel. Job control also provides highly qualified assistance when an emergency ensues or when a malfunction cannot be readily resolved by the technicians. For the technicians, the work day is complete after being released from complex by job control. But for the six alternating personnel locked within the soundproof confines of job control, the days, nights, weekends, and holidays blend into a never ending watch of our nation's best weapons of deterrence.

Each one of us has a specific job to do. No matter how minor that function might be, we all play an intricate part in maintaining the Titan II system. Though there may be occasional adversities between job control and the maintenance technicians, a bond of respect must be established. As we are all here to support the mission to its utmost capability, without one or the other, neither could function.

SAC SAFETY SCREEN

69 BMS, Loring Crew E-28: P Capt Scott L Berg, CP 1Lt Robert L Heim, RN Capt Robert G Blum, N 1Lt Douglas L Schrag, EWO Capt Thomas A Gaj, G SSgt Steve M Boughner

42 AREFS, Loring Crew R-123: P Capt Richard L Stewart, CP 2Lt Richard K Sprenger, N 1Lt Joseph R Fontana, BO SrA Kelly R. Philbrick

407 AREFS, Loring Crew E-183: P Capt Richard A Steele, CP Capt Joseph B Delia, N 2Lt Thomas C Philipps, BO SrA John M Polanshek

41 AREFS, Griffiss Crew E-106: FP Capt Hampton H Guelich, CP 1Lt Bradley E Creed, NN 1Lt Christopher A Dearinger, IBO SSgt Jack W Sprague

668 BMS, Griffiss Crew S-02: FP Capt John R. Sundy, CP Capt Andrew L Kjeldgaard, RN Capt William W Thum, NN 1Lt Michael J Huhn, EW Capt Leonard A Amrhein, AG SrA John P Wooldridge

509 AREFS, Pease Crew S-120: P Maj Paul M Breen, CP Capt Raumond Brunelle, N Capt Margaret Stanek, BO Sgt Robert Christopher

509 AREFS, Pease Crew E-132: P Capt Robert T Adkison, CP Capt David W Roberts, N 1Lt Bryan A Davies, BO SrA Richard A Radvanyi

46 AREFS, K I Sawyer Crew S-118: P Maj William D Smith, CP Capt Craig Soderquist, N Capt Mark E Nelson, BO SSgt Donald O Frol

46 AREFS, K I Sawyer Crew R-115: P Capt Burnell W Bailey, CP 1Lt Leland G Lane, N 1Lt Everett C Dewolfe III, BO A1C Robert L Skelton

644 BMS, K I Sawyer: IP Capt Cloyce W Scheer, P Capt Ronald C Marcotte Jr, CP 1Lt Robert E Wheelock, RN Capt Howard M Harding, N 1Lt Lawrence John, EWO 1Lt David E Hedin, G A1C George E Collins

909 AREFS, Kadena Crew R-121: P Capt Brad O Buchman, CP 1Lt Rosario Nici, IN Capt William R Fox, IS SSgt Frederick J Bookwalter

905 AREFS, Grand Forks Crew S-123: P Lt Col Paul Coesfeld, CP 1Lt Norm Robinson, N Maj Bill Newell, BO TSgt Al Bekkerus

46 BMS, Grand Forks Crew E-20: P Maj Lou Beck, CP 1Lt Keith Pearson, RN Maj Tom Walsh, N Capt Dave Snodgrass, EW 1Lt Mark Rounds, AG SSgt Mike Hammond

43 AREFS, Fairchild Crew R-121: P Capt Jerome W Voigt, CP Capt Robert G Haroldsen, N Capt Johnny N Warner, BO SSgt Richard J Newman

22 AREFS, March Crew E-120: IP Maj James E Otterbein, CP Capt Ramon P Mata, IN Capt Thomas J Solecki, IS SSgt Robert C Morgan

6 SW, Eielson Crew S-02: IP Capt William S Littell, CP Capt Kevin S Larson, IN Capt Gordon S Alder, N2 Capt Stephen P Marino

6 SW, Eielson Crew E-15: TC Capt Jeffery K Hutchinson, R1 Capt Larry A Mayfield, R2 1Lt Aubrey G Lawson, MT 1Lt Howard G Cohen, R4 1Lt Wayne L Stafford, R4 Capt James E Ring, R2 Capt James F Powell, PT Sgt Robert B O'Borne, ET SSgt William G Landin

5 BMW, Minot Crew E-109: P Capt Gerald E Lewis, CP Capt Orval A Nelson Jr, NN Capt Steven R Johnson, BO SSgt Richard A Raprager

44 SMW, Ellsworth Crew R-094: MCCC 1Lt Harold C Stuart, DMCCC 2Lt Bill H Etheridge

90 SMW, F E Warren Crew E-101: MCCC Capt Warren A Von Werne, DMCCC 1Lt John D Paine IV

91 SMW, Minot Crew E-024: MCCC 1Lt Jimmie D Walter, DMCCC 2Lt Paul J Anderson

321 SMW, Grand Forks Crew R-123: MCCC Capt Michael J Wallace, DMCCC 1Lt David A Moore

351 SMW, Whiteman Crew E-131: MCCC Capt Richard A Lien, DMCCC 2Lt Gregory L Smith

390 SMW, Davis-Monthan Crew E-050: MCCC Maj Ivan Haynie, DMCCC 2Lt Lawrence E Wake, BMAT Sgt Timothy J Gallagher, MFT SrA Christopher Graybill

*U S Government Printing Office
1981 — 765-047/4

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United States Air Force SAFETY AWARDS FOR CY 1980

The following Strategic Air Command units have been recognized by the United States Air Force for their contribution to safety:

FLIGHT SAFETY PLAQUE

410th Bombardment Wing
55th Strategic Reconnaissance Wing
6th Strategic Wing
93d Bombardment Wing

MISSILE SAFETY PLAQUE

320th Bombardment Wing
390th Strategic Missile Wing
381st Strategic Missile Wing
341st Strategic Missile Wing

NUCLEAR SAFETY PLAQUE

319th Munitions Maintenance Squadron
379th Bombardment Wing
321st Strategic Missile Wing

EXPLOSIVES SAFETY PLAQUE

380th Bombardment Wing
43d Strategic Wing